



#10

SEQUENCE LISTING

<110> Rajgarhia, Vineet

<120> Methods and materials for synthesis of organic products

<130> 00-1237-A

<140> 09/992,430

<141> 2001-11-23

<150> 60/252,541

<151> 2000-11-22

<160> 65

<170> PatentIn version 3.1

<210> 1

<211> 92

<212> DNA

<213> artificial sequence

<220>

<223> multiple cloning site

<220>

<221> misc_feature

<223> multiple cloning site

<400> 1

cccaagcttg aattccccgg gggatccctg cagggtagca cgcgtagatc tactagtgcg 60

gccgcctcga gtctagaggg cccaagcttg gg 92

<210> 2

<211> 91

<212> DNA

<213> artificial sequence

<220>

<223> multiple cloning site

<220>

<221> misc_feature

<223> multiple cloning site

<400> 2

ccaagcttgg gccctctaga ctgagggcgg ccgcactagt agatctacgc gtggtaccct 60

gcagggatcc cccggggaat tcaagcttgg g 91

<210> 3

<211> 31
 <212> DNA
 <213> *Lactobacillus helveticus*

 <400> 3
 ccgggatcca tggcaagaga ggaaaaacct c 31

 <210> 4
 <211> 32
 <212> DNA
 <213> *Lactobacillus helveticus*

 <400> 4
 ccaagatctt tattgacgaa ccttaacgcc ag 32

 <210> 5
 <211> 37
 <212> DNA
 <213> *Pediococcus acidilactici*

 <400> 5
 ccgggatcca tgtctaatat tcaaaatcat caaaaag 37

 <210> 6
 <211> 33
 <212> DNA
 <213> *Pediococcus acidilactici*

 <400> 6
 ccaagatctt tatttgtctt gtttttcagc aag 33

 <210> 7
 <211> 82
 <212> DNA
 <213> *Kluyveromyces marxianus*

 <400> 7
 taaacagtac aatcgcaaag aaaagctcca cacccaaacc aaataattgc aatgcaactt 60
 cttttctttt tttttctttt ct 82

 <210> 8
 <211> 79
 <212> DNA
 <213> *Kluyveromyces marxianus*

 <400> 8
 ttataaaatc attaaaatcc aaaatcgtaa tttatctctt tctcctctcc ctctctacat 60
 gccggtagag gtgtgggtca 79

<210> 9
<211> 1736
<212> DNA
<213> kanamycin resistance gene

<400> 9
gtacaacttg agcaagttgt cgatcagctc ctcaaattgg tcctctgtaa cggatgactc 60
aacttgcaca ttaacttgaa gctcagtcga ttgagtgaac ttgatcaggt tgtgcagctg 120
gtcagcagca tagggaaaca cggcttttcc taccaaactc aaggaattat caaactctgc 180
aacacttgcg tatgcaggta gcaagggaaa tgtcatactt gaagtcggac agtgagtgtg 240
gtcttgagaa attctgaagc cgtattttta ttatcagtga gtcagtcatc aggagatcct 300
ctacgccgga cgcacgtgg cgcacctgca gggggggggg gggcgctgag gtctgcctcg 360
tgaagaaggt gttgctgact cataccaggc ctgaatcgcc ccatcatcca gccagaaagt 420
gaggagacca cggttgatga gagctttgtt gtaggtggac cagttgggtga ttttgaactt 480
ttgctttgcc acggaacggt ctgcgttgtc gggaagatgc gtgatctgat ccttcaactc 540
agcaaaagtt cgattttatt aacaaagccg ccgtcccgtc aagtcagcgt aatgctctgc 600
cagtgttaca accaattaac caattctgat tagaaaaact catcgagcat caaatgaaac 660
tgcaatttat tcatatcagg attatcaata ccatattttt gaaaaagccg tttctgtaat 720
gaaggagaaa actcaccgag gcagttccat aggatggcaa gatcctggta tcggtctgcg 780
attccgactc gtccaacatc aatacaacct ttaatttccc ctcgtaaaaa ataaggttat 840
caagtggagaa atcaccatga gtgacgactg aatccggtga gaatggcaaa agcttatgca 900
ttctttccag acttgitcaa caggccagcc attacgctcg tcatcaaaat cactcgcac 960
aaccaaaccg ttattcattc gtgattgctc ctgagcgaga cgaaatacgc gatcgtgtt 1020
aaaaggacaa ttacaaacag gaatcgaatg caaccggcgc aggaacactg ccagcgcac 1080
aacaatattt tcacctgaat caggatatc ttctaatacc tggaatgctg tttcccggg 1140
gatcgcagtg gtgagtaacc atgcatcatc aggagtacgg ataaaatgct tgatggtcgg 1200
aagaggcata aattccgtca gccagtttag tctgaccatc tcatctgtaa catcattggc 1260
aacgctacct ttgcatggt tcagaaacaa ctctggcgca tcgggcttcc catacaatcg 1320
atagattgtc gcacctgatt gcccgacatt atcgcgagcc catttatacc catataaatc 1380
agcatccatg ttggaattta atcgcggcct cgagcaagac gtttcccgtt gaatatggct 1440
cataacaccc cttgtattac tgtttatgta agcagacagt tttattgttc atgatgatat 1500
atttttatct tgtgcaatgt aacatcagag attttgagac acaacgtggc tttccccccc 1560

ccccctgcag gtcggcatca ccggcgccac aggtgcggtt gctggcgctt atatcgccga 1620
catcaccgat ggggaagatc gggctcgcca cttcgggctc atgagcgctt gtttcggcgt 1680
gggtatggtg gcaggccccg tggccggggg actggtgggc gccatctcct tgcattg 1736

<210> 10
<211> 372
<212> DNA
<213> Kluyveromyces marxianus

<400> 10
ccggttcttt ctcttactct tacaagacca agaacattgt cgaattccac tccgactaca 60
tcaaggtcag aaacgccact ttcccagggtg tccaaatgaa gttcgtcttg caaaagttgt 120
tgaccaaggt caaggatgct gctaagggtt acaagccagt tccagttcct cacgctccaa 180
gagacaacaa gccagttgct gactctactc cattgaagca agaatgggtc tggactcaag 240
tcggtaagtt cctacaagaa ggtgatgttg ttctaactga aaccggtacc tccgctttcg 300
gtatcaacca aaccacttc ccaaagaca cctacggtat ctccaagtc ttgtgggggt 360
ccattggttt ca 372

<210> 11
<211> 747
<212> DNA
<213> Kluyveromyces thermotolerans

<400> 11
ttaccactgt cttcggtctg ccagggtgact tcaatctgcg tctggtggac gagatctacg 60
aggtcgaggg tatgagatgg gccggtaact gtaacgagtt gaacgcttct tacgctgccg 120
acgcttacgc cagaatcaag ggtatgtcct gtttgatcac caccttcggt gtcggtgagt 180
tgtccgcttt gaacggtatc gccggttctt acgctgagca cgtcgggtgc ttgcacattg 240
tcggtgtccc atccgtctcc gcccaggcca agcagctatt gttgcaccac accttgggta 300
acggtgactt cactgtcttc cacagaatgt ccgccaacat ctctgagacc actgctatga 360
tactgatct agctaccgcc ccatctgaga tcgacagatg tatcagaacc acctacatta 420
gacagagacc tgtctacttg ggtttgccat ctaacttcgt tgaccagatg gtcccagcct 480
ctctattgga caccccaatt gacttggcct tgaagccaaa cgaccagcag gctgaggagg 540
aggtcatctc tactttgttg gagatgatca aggacgctaa gaaccagtc atcttggtg 600
acgcttgccg ttccagacac gatgtcaagg ctgagaccaa gaagttgatt gacatcactc 660

agttcccatc tttcgttac ccaatgggta agggttccat tgacgagaag cacccaagat 720
 tcggtggtgt ctacgtcggg accttgt 747

<210> 12
 <211> 1738
 <212> DNA
 <213> kanamycin resistance gene fragment

<400> 12
 gtacaacttg agcaagttgt cgatcagctc ctcaaattgg tcctctgtaa cggatgactc 60
 aacttgcaca ttaacttgaa gctcagtcga ttgagtgaac ttgatcaggt tgtgcagctg 120
 gtcagcagca tagggaaaca cggcttttcc taccaaactc aaggaattat caaactctgc 180
 aacacttgcg tatgcaggta gcaagggaaa tgtcatactt gaagtcggac agtgagtgta 240
 gtcttgagaa attctgaagc cgtattttta ttatcagtga gtcagtcac aggagatcct 300
 ctacgcogga cgcacgtgg cgcacctgca gggggggggg gggcgctgag gtctgcctcg 360
 tgaagaaggt gttgctgact cataccaggc ctgaatcgcc ccatcatcca gccagaaagt 420
 gagggagcca cggttgatga gagctttggt gtaggtggac cagttggtga ttttgaactt 480
 ttgctttgcc acggaacggg ctgcgttgtc gggaaagatgc gtgatctgat ccttcaactc 540
 agcaaaagtt cgattttatt aacaaagccg ccgtcccgtc aagtcagcgt aatgctctgc 600
 cagtgttaca accaattaac caattctgat tagaaaaact catcgagcat caaatgaaac 660
 tgcaatttat tcatatcagg attatcaata ccatattttt gaaaaagccg tttctgtaat 720
 gaaggagaaa actcaccgag gcagttccat aggatggcaa gatcctggta tcggtctgcg 780
 attccgactc gtccaacatc aatacaacct attaatctcc cctcgtcaaa aataagggtta 840
 tcaagtgaga aatcaccatg agtgacgact gaatccggtg agaatggcaa aagcttatgc 900
 atttctttcc agacttggtc aacaggccag ccattacgct cgtcatcaaa atcactcgca 960
 tcaaccaaac cgttattcat tcgtgattgc gcctgagcga gacgaaatac gcgatcgctg 1020
 ttaaaaggac aattacaaac aggaatcgaa tgcaaccggc gcaggaacac tgccagcgca 1080
 tcaacaatat tttcacctga atcaggatat tcttctaata cctggaatgc tgttttcccg 1140
 gggatcgagc tgggtgagtaa ccatgcatca tcaggagtac ggataaaatg cttgatggtc 1200
 ggaagaggca taaattccgt cagccagttt agtctgacca tctcatctgt aacatcattg 1260
 gcaacgctac ctttgccatg tttcagaaac aactctggcg catcgggctt cccatacaat 1320
 cgatagattg tcgcacctga ttgcccagca ttatcgcgag cccatttata cccatataaa 1380

tcagcatcca tgttggaatt taatcgcggc ctcgagcaag acgtttcccg ttgaatatgg 1440
ctcataacac cccttgtatt actgtttatg taagcagaca gttttattgt tcatgatgat 1500
atatttttat cttgtgcaat gtaacatcag agattttgag acacaacgtg gctttccccc 1560
ccccccctgc aggtcggcat caccggcgcc acaggtgcgg ttgctggcgc ctatatcgcc 1620
gacatcaccg atggggaaga tcgggctcgc cacttcgggc tcatgagcgc ttgtttcggc 1680
gtgggtatgg tggcaggccc cgtggccggg ggactgttgg gcgccatctc cttgcatg 1738

<210> 13
<211> 17
<212> DNA
<213> artificial sequence

<220>
<223> degenerate amplification primer

<220>
<221> misc_feature
<222> (1)..(17)
<223> degenerate amplification primers

<400> 13
gtbatygyt chggtac 17

<210> 14
<211> 17
<212> DNA
<213> artificial sequence

<220>
<223> degenerate amplification primer

<220>
<221> misc_feature
<222> (1)..(17)
<223> degenerate amplification primers

<400> 14
swrtcdccrt gytacc 17

<210> 15
<211> 22
<212> DNA
<213> artificial sequence

<220>
<223> amplification primer

<220>
<221> misc_feature
<222> (1)..(22)
<223> amplification primer

<400> 15
gtacagttct ggatactgct cg

22

<210> 16
<211> 18
<212> DNA
<213> artificial sequence

<220>
<223> amplification primer

<220>
<221> misc_feature
<222> (1)..(18)
<223> amplification primers

<400> 16
acaggcatcg atgctgtc

18

<210> 17
<211> 19
<212> DNA
<213> Kluyveromyces thermotolerans

<400> 17
gtgatgtcgg cgatatagg

19

<210> 18
<211> 21
<212> DNA
<213> Kluyveromyces thermotolerans

<400> 18
ctacttgag ccactatcga c

21

<210> 19
<211> 21
<212> DNA
<213> Kluyveromyces thermotolerans

<400> 19
gatctcctgc taagctcttg c

21

<210> 20
<211> 20

<212> DNA
<213> Kluyveromyces thermotolerans

<400> 20
gcagttttgg atattcatgc 20

<210> 21
<211> 972
<212> DNA
<213> Kluyveromyces thermotolerans

<400> 21
atgttccaag atacaaagtc tcaagcagta agaactgatg ccaaaacagt aaaagttgtg 60
gtagtgggag tgggaagtgt tgggtctgcc acagcgtata cgttgcttct cagcggcatc 120
gtttccgaga ttgtccttat cgacgtgaac aaagacaaag cagaggggtga aagcatggac 180
ttaaaccacg cagcaccttc aaatacaagg tctcgagcgg gtgattatcc tgactgcgct 240
ggcgcggcca ttgttattgt cacatgtggg attaaccaaa aaaatggaca aacaaggatg 300
gatcttgctg caaaaaatgc caacattatg ctggaaatca tccccaatgt tgccaaatat 360
gctcctgata ccacctctgt tattgccacg aatcctgtcg atgttttgac ctatattagc 420
tataaggcgt cagggtttcc actaagcaga gttatcggct caggtacagt tctggatact 480
gctcgtttta aatacatcct cggagagcac ttcaagatct catcggacag catcgatgcc 540
tgtgtaattg gagaacatgg tgattcgggt gtgcctgtct ggtctcttac caacatcgac 600
ggcatgaagc tccgggatta ctgcgaaaaa gccaaccaca tatttgatca gaatgcgttc 660
catagaatct ttgagcaaac gcgagacgct gcttacgata tcatcaagcg caaaggctat 720
acttcatatg gaatcgagc gggattactt cgcatagtaa aggcgatttt agaggataca 780
ggatccacac ttacagtttc aaccgttggg gattattttg gggttgaaca aattgctata 840
agcgtcccta ccaaactcaa taaaagtggg gctcatcaag tggctgaact ttactcgat 900
gagaaggaaa tagaattgat ggaaaaatca gctagtcaga tcaaatcagt gattgagcat 960
ctggagatca at 972

<210> 22
<211> 323
<212> PRT
<213> Kluyveromyces thermotolerans

<400> 22

Met Phe Gln Asp Thr Lys Ser Gln Ala Val Arg Thr Asp Ala Lys Thr
1 5 10 15

Val Lys Val Val Val Val Gly Val Gly Ser Val Gly Ser Ala Thr Ala
20 25 30

Tyr Thr Leu Leu Leu Ser Gly Ile Val Ser Glu Ile Val Leu Ile Asp
35 40 45

Val Asn Lys Asp Lys Ala Glu Gly Glu Ser Met Asp Leu Asn His Ala
50 55 60

Ala Pro Ser Asn Thr Arg Ser Arg Ala Gly Asp Tyr Pro Asp Cys Ala
65 70 75 80

Gly Ala Ala Ile Val Ile Val Thr Cys Gly Ile Asn Gln Lys Asn Gly
85 90 95

Gln Thr Arg Met Asp Leu Ala Ala Lys Asn Ala Asn Ile Met Leu Glu
100 105 110

Ile Ile Pro Asn Val Ala Lys Tyr Ala Pro Asp Thr Ile Leu Leu Ile
115 120 125

Ala Thr Asn Pro Val Asp Val Leu Thr Tyr Ile Ser Tyr Lys Ala Ser
130 135 140

Gly Phe Pro Leu Ser Arg Val Ile Gly Ser Gly Thr Val Leu Asp Thr
145 150 155 160

Ala Arg Phe Lys Tyr Ile Leu Gly Glu His Phe Lys Ile Ser Ser Asp
165 170 175

Ser Ile Asp Ala Cys Val Ile Gly Glu His Gly Asp Gly Val Pro Val
180 185 190

Trp Ser Leu Thr Asn Ile Asp Gly Met Lys Leu Arg Asp Tyr Cys Glu
195 200 205

Lys Ala Asn His Ile Phe Asp Gln Asn Ala Phe His Arg Ile Phe Glu
210 215 220

Gln Thr Arg Asp Ala Ala Tyr Asp Ile Ile Lys Arg Lys Gly Tyr Thr
225 230 235 240

Ser Tyr Gly Ile Ala Ala Gly Leu Leu Arg Ile Val Lys Ala Ile Leu
245 250 255

Glu Asp Thr Gly Ser Thr Leu Thr Val Ser Thr Val Gly Asp Tyr Phe
260 265 270

Gly Val Glu Gln Ile Ala Ile Ser Val Pro Thr Lys Leu Asn Lys Ser
275 280 285

Gly Ala His Gln Val Ala Glu Leu Ser Leu Asp Glu Lys Glu Ile Glu
290 295 300

Leu Met Glu Lys Ser Ala Ser Gln Ile Lys Ser Val Ile Glu His Leu
305 310 315 320

Glu Ile Asn

<210> 23
<211> 20
<212> DNA
<213> artificial sequence

<220>
<223> degenerate amplification primer

<220>
<221> misc_feature
<223> degenerate amplification primers

<400> 23
gtygggtgchg gtgchgthgg

20

<210> 24
<211> 17
<212> DNA
<213> artificial sequence

<220>
<223> degenerate amplification primer

<220>
<221> misc_feature
<223> degenerate amplification primers

<400> 24
swrtcdccrt gytcbcc

17

<210> 25
<211> 27
<212> DNA
<213> artificial sequence

<220>
<223> amplification primer

<220>
<221> misc_feature
<223> amplification primers

<400> 25
atccacaaca gcttacacgt tattgag

27

<210> 26
<211> 28
<212> DNA
<213> artificial sequence

<220>
<223> amplification primer

<220>
<221> misc_feature
<223> amplification primers

<400> 26
gtttggttgc tggaagtggg gttgatag

28

<210> 27
<211> 27
<212> DNA
<213> artificial sequence

<220>
<223> amplification primer

<220>
<221> misc_feature
<223> amplification primers

<400> 27
aacattgaat agcttgctca ggttggtg

27

<210> 28
<211> 28
<212> DNA
<213> artificial sequence

<220>
<223> amplification primer

<220>
<221> misc_feature
<223> amplification primers

<400> 28
gataataaac gcgttgacat ttcagatg

28

<210> 29
<211> 939
<212> DNA
<213> *Torulaspora pretoriensis*

<220>
<221> CDS
<222> (1)..(939)
<223>

<400> 29
atg cat aga tgt gct aaa gtg gcc atc gtc ggt gcc ggc caa gtt gga 48
Met His Arg Cys Ala Lys Val Ala Ile Val Gly Ala Gly Gln Val Gly
1 5 10 15

tcc aca aca gct tac acg tta tta ttg agt agt ttg gtt gct gaa gtg 96
Ser Thr Thr Ala Tyr Thr Leu Leu Leu Ser Ser Leu Val Ala Glu Val
20 25 30

gtg ttg ata gat gtc gat aaa aga aag gtc gaa ggc caa ttt atg gat 144
Val Leu Ile Asp Val Asp Lys Arg Lys Val Glu Gly Gln Phe Met Asp
35 40 45

ctg aac cac gcg gct cct tta acg aag gag tca cga ttc agt gct ggg 192
Leu Asn His Ala Ala Pro Leu Thr Lys Glu Ser Arg Phe Ser Ala Gly
50 55 60

gac tat gaa agt tgt gct gat gct gcg gtt gta atc gta acg ggc ggg 240
Asp Tyr Glu Ser Cys Ala Asp Ala Ala Val Val Ile Val Thr Gly Gly
65 70 75 80

gct aat cag aaa cct ggt caa act aga atg gag cta gcc gag agg aac 288
Ala Asn Gln Lys Pro Gly Gln Thr Arg Met Glu Leu Ala Glu Arg Asn
85 90 95

gtt aaa atc atg cag gaa gtg atc cct aag att gtg aaa tac gcc ccc 336
Val Lys Ile Met Gln Glu Val Ile Pro Lys Ile Val Lys Tyr Ala Pro
100 105 110

aac gca att ttg ctg att gca aca aac cct gtc gat gta ctt acc tat 384
Asn Ala Ile Leu Leu Ile Ala Thr Asn Pro Val Asp Val Leu Thr Tyr
115 120 125

gct agt ttg aaa gcg tcg gga ttc cca gca agc cgg gtt att ggt tct 432

Ala Ser Leu Lys Ala Ser Gly Phe Pro Ala Ser Arg Val Ile Gly Ser
 130 135 140

ggg aca gtt ctc gac tct gct cgt ata cag cac aac ctg agc aag cta 480
 Gly Thr Val Leu Asp Ser Ala Arg Ile Gln His Asn Leu Ser Lys Leu
 145 150 155 160

ttc aat gtt tca tct gaa agt gtc aac gcg ttt att atc ggg gaa cat 528
 Phe Asn Val Ser Ser Glu Ser Val Asn Ala Phe Ile Ile Gly Glu His
 165 170 175

ggg gac tca agt gtg ccc gtc tgg tcg ctt gct gag att gcc ggc atg 576
 Gly Asp Ser Ser Val Pro Val Trp Ser Leu Ala Glu Ile Ala Gly Met
 180 185 190

aaa gtg gag gat tac tgt agg cag tcc aag aga aag ttt gac ccc agc 624
 Lys Val Glu Asp Tyr Cys Arg Gln Ser Lys Arg Lys Phe Asp Pro Ser
 195 200 205

att ctg acc aaa ata tat gag gag tcg cgt gac gcg gca gcc tac atc 672
 Ile Leu Thr Lys Ile Tyr Glu Glu Ser Arg Asp Ala Ala Ala Tyr Ile
 210 215 220

ata gaa cgc aaa ggc tat acc aat ttc ggg att gca gca ggt ttg gct 720
 Ile Glu Arg Lys Gly Tyr Thr Asn Phe Gly Ile Ala Ala Gly Leu Ala
 225 230 235 240

agg ata gtg aga gct att ctg aga gat gaa ggt gcc cta tta act gtg 768
 Arg Ile Val Arg Ala Ile Leu Arg Asp Glu Gly Ala Leu Leu Thr Val
 245 250 255

tct act gta ggt gag cac ttt ggc atg aaa gat gtt tca ttg agt gtt 816
 Ser Thr Val Gly Glu His Phe Gly Met Lys Asp Val Ser Leu Ser Val
 260 265 270

cca act agg gta gac agg agc ggc gct cac cat gtc gtc gac ctt ctg 864
 Pro Thr Arg Val Asp Arg Ser Gly Ala His His Val Val Asp Leu Leu
 275 280 285

cta aac gac aag gag ctg gag caa att aaa aca tct gga gcc aag ata 912
 Leu Asn Asp Lys Glu Leu Glu Gln Ile Lys Thr Ser Gly Ala Lys Ile
 290 295 300

aag tca gcc tgt gat gaa ctt ggc att 939
 Lys Ser Ala Cys Asp Glu Leu Gly Ile
 305 310

<210> 30
 <211> 313
 <212> PRT
 <213> Torulaspora pretoriensis

<400> 30

Met His Arg Cys Ala Lys Val Ala Ile Val Gly Ala Gly Gln Val Gly
 1 5 10 15

Ser Thr Thr Ala Tyr Thr Leu Leu Leu Ser Ser Leu Val Ala Glu Val
20 25 30

Val Leu Ile Asp Val Asp Lys Arg Lys Val Glu Gly Gln Phe Met Asp
35 40 45

Leu Asn His Ala Ala Pro Leu Thr Lys Glu Ser Arg Phe Ser Ala Gly
50 55 60

Asp Tyr Glu Ser Cys Ala Asp Ala Ala Val Val Ile Val Thr Gly Gly
65 70 75 80

Ala Asn Gln Lys Pro Gly Gln Thr Arg Met Glu Leu Ala Glu Arg Asn
85 90 95

Val Lys Ile Met Gln Glu Val Ile Pro Lys Ile Val Lys Tyr Ala Pro
100 105 110

Asn Ala Ile Leu Leu Ile Ala Thr Asn Pro Val Asp Val Leu Thr Tyr
115 120 125

Ala Ser Leu Lys Ala Ser Gly Phe Pro Ala Ser Arg Val Ile Gly Ser
130 135 140

Gly Thr Val Leu Asp Ser Ala Arg Ile Gln His Asn Leu Ser Lys Leu
145 150 155 160

Phe Asn Val Ser Ser Glu Ser Val Asn Ala Phe Ile Ile Gly Glu His
165 170 175

Gly Asp Ser Ser Val Pro Val Trp Ser Leu Ala Glu Ile Ala Gly Met
180 185 190

Lys Val Glu Asp Tyr Cys Arg Gln Ser Lys Arg Lys Phe Asp Pro Ser
195 200 205

Ile Leu Thr Lys Ile Tyr Glu Glu Ser Arg Asp Ala Ala Ala Tyr Ile
210 215 220

Ile Glu Arg Lys Gly Tyr Thr Asn Phe Gly Ile Ala Ala Gly Leu Ala
225 230 235 240

Arg Ile Val Arg Ala Ile Leu Arg Asp Glu Gly Ala Leu Leu Thr Val
245 250 255

Ser Thr Val Gly Glu His Phe Gly Met Lys Asp Val Ser Leu Ser Val
260 265 270

Pro Thr Arg Val Asp Arg Ser Gly Ala His His Val Val Asp Leu Leu
275 280 285

Leu Asn Asp Lys Glu Leu Glu Gln Ile Lys Thr Ser Gly Ala Lys Ile
290 295 300

Lys Ser Ala Cys Asp Glu Leu Gly Ile
305 310

<210> 31
<211> 21
<212> DNA
<213> Bacillus megaterium

<400> 31
cctgagtcca cgtcattatt c 21

<210> 32
<211> 22
<212> DNA
<213> Bacillus megaterium

<400> 32
tgaagctatt tattcttggt ac 22

<210> 33
<211> 27
<212> DNA
<213> Bacillus megaterium

<400> 33
gctctagatg aaaacacaat ttacacc 27

<210> 34
<211> 28
<212> DNA
<213> Bacillus megaterium

<400> 34
atggatcctt acacaaaagc tctgtcgc 28

<210> 35
<211> 26
<212> DNA
<213> Rhizopus oryzae

<400> 35
ctttattttt ctttacaata taattc

26

<210> 36
<211> 19
<212> DNA
<213> Rhizopus oryzae

<400> 36
actagcagtg caaaacatg

19

<210> 37
<211> 29
<212> DNA
<213> Rhizopus oryzae

<400> 37
gctctagatg gtattacact caaaggctcg

29

<210> 38
<211> 30
<212> DNA
<213> Rhizopus oryzae

<400> 38
gctctagatc aacagctact tttagaaaag

30

<210> 39
<211> 28
<212> DNA
<213> artificial sequence

<220>
<223> cloning site sequence

<400> 39
aaatctagat gagccatatt caacggga

28

<210> 40
<211> 29
<212> DNA
<213> artificial sequence

<220>
<223> cloning site sequence

<400> 40

ccggatcctt agaaaaactc atcgagcat

29

<210> 41

<211> 36

<212> DNA

<213> Kluyveromyces thermotolerans

<400> 41

gctctagaat tatgttccaa gatacaaagt ctcaag

36

<210> 42

<211> 34

<212> DNA

<213> Kluyveromyces thermotolerans

<400> 42

ccggaattca tcctcaattg atctccagat gctc

34

<210> 43

<211> 2229

<212> DNA

<213> Kluyveromyces thermotolerans

<400> 43

gcggccgcgg atcgctcttc cgctatcgat taattttttt ttctttcctc tttttattaa 60
ccttaatttt tatttttagat tcctgacctt caactcaaga cgacacagata ttataacatc 120
tgcacaatag gcatttgcaa gaattactcg tgagtaagga aagagtgagg aactatcgca 180
tacctgcatt taaagatgcc gatttgggcg cgaatccttt attttggctt caccctcata 240
ctattatcag ggccagaaaa aggaagtgtt tccctccttc ttgaattgat gttaccctca 300
taaagcacgt ggcctcttat cgagaaagaa attaccgtcg ctcgtgattt gtttgcaaaa 360
agaacaaaac tgaaaaaacc cagacacgct cgacttcctg tcttcctatt gattgcagct 420
tccaatttcg tcacacaaca aggtcctagc gacggctcac aggttttgta acaagcaatc 480
gaaggttctg gaatggcggg aaagggttta gtaccacatg ctatgatgcc cactgtgatc 540
tccagagcaa agttcgttcg atcgtactgt tactctctct ctttcaaaca gaattgtccg 600
aatcgtgtga caacaacagc ctgttctcac aactctttt cttctaacca agggggtggt 660
ttagtttagt agaacctcgt gaaacttaca ttacatata tataaacttg cataaattgg 720
tcaatgcaag aaatacatat ttgggtcttt ctaattcgta gtttttcaag ttcttagatg 780
ctttcttttt ctctttttta cagatcatca aggaagtaat tatctacttt ttacaacaaa 840
tctagaatta tgttccaaga tacaaagtct caagcagtaa gaactgatgc caaaacagta 900

aaagtgtggt tagtgggagt gggaagtgtt gggcttgcca cagcgtatac gttgcttctc 960
 agcggcatcg tttccgagat tgtccttatac gacgtgaaca aagacaaagc agaggggtgaa 1020
 agcatggact taaaccacgc agcaccttca aatacaaggt ctcgagcggg tgattatcct 1080
 gactgcgctg gcgcggccat tgttattgtc acatgtggga ttaacaaaaa aaatggacaa 1140
 acaaggatgg atcttgctgc aaaaaatgcc aacattatgc tggaaatcat cccaatgtt 1200
 gccaaatatg ctctgatac catcctgctt attgccacga atcctgtcga tgttttgacc 1260
 tatattagct ataaggcgtc agggtttcca ctaagcagag ttatcggtc aggtacagtt 1320
 ctggatactg ctggttttaa atacatctc ggagagcact tcaagatctc atcggacagc 1380
 atcgatgcct gtgtaattgg agaacatggt gattcgggtg tgcctgtctg gtctcttacc 1440
 aacatcgacg gcatgaagct ccgggattac tgcgaaaaag ccaaccacat atttgatcag 1500
 aatgcgttcc atagaatctt tgagcaaacg cgagacgctg cttacgatat catcaagcgc 1560
 aaaggctata cttcatatgg aatgcagcg ggattacttc gcatagtaaa ggcgatttta 1620
 gaggatacag gatccacact tacagtttca accgttggtg attattttgg ggttgaacaa 1680
 attgctataa gcgtccctac caaactcaat aaaagtgggg ctcacatcaagt ggtgaactt 1740
 tcaactcgatg agaaggaaat agaattgatg gaaaaatcag ctagtcagat caaatcagtg 1800
 attgagcatc tggagatcaa ttgaggatga attcggatcc ggtagatata ttgatgctat 1860
 caatccagag aactggaaaag attgtgtagc cttgaaaaac ggtgaaactt acgggtccaa 1920
 gattgtctac agattttcct gatttgccag cttactatcc ttcttgaaaa tatgcaactt 1980
 atatctttta gttcttaatt gcaacacata gatttgctgt ataacgaatt ttatgctatt 2040
 ttttaaattt ggagttcagt gataaaagtg tcacagcgaa tttcctcaca ttaggggacc 2100
 gaattgttta caagttctct gtaccacat ggagacatca aaaattgaaa atctatggaa 2160
 agatatggac ggtagcaaca agaatatagc acgagccgcg gatttatttc gttacgcatg 2220
 cgcgccgc 2229

<210> 44
 <211> 32
 <212> DNA
 <213> Candida sonorensis

<400> 44
 tggactagta aaccaacagg gattgcctta gt

<211> 33
<212> DNA
<213> *Candida sonorensis*

<400> 45
ctagtctaga gatcattacg ccagcatcct agg

33

<210> 46
<211> 37
<212> DNA
<213> *Candida albicans*

<400> 46
gcgatctcga ggtcctagaa tatgtatact aatttgc

37

<210> 47
<211> 36
<212> DNA
<213> *Candida albicans*

<400> 47
acttgccat ggtgatagtt attcttctgc aattga

36

<210> 48
<211> 20
<212> DNA
<213> *Saccharomyces cerevisiae*

<400> 48
tgtcatcact gctccatctt

20

<210> 49
<211> 20
<212> DNA
<213> *Saccharomyces cerevisiae*

<400> 49
ttaagccttg gcaacatatt

20

<210> 50
<211> 37
<212> DNA
<213> *Candida albicans*

<400> 50
gcgatctcga ggtcctagaa tatgtatact aatttgc

37

<210> 51
<211> 39
<212> DNA
<213> *Candida albicans*

<400> 51
cgcggaattcc catggttagt ttttggtgga aagagcaac 39

<210> 52
<211> 32
<212> DNA
<213> Candida sonorensis

<400> 52
tggactagta aaccaacagg gattgcctta gt 32

<210> 53
<211> 33
<212> DNA
<213> Candida sonorensis

<400> 53
ctagtctaga gatcattacg ccagcatcct agg 33

<210> 54
<211> 44
<212> DNA
<213> Candida sonorensis

<400> 54
ccggaattcg atatctgggc wggkaatgcc aaygarttra atgc 44

<210> 55
<211> 44
<212> DNA
<213> Candida sonorensis

<220>
<221> misc_feature
<222> (33)..(33)
<223> primer that does not encode amino acid

<220>
<221> misc_feature
<222> (21)..(21)
<223> primer that does not encode amino acid

<400> 55
cgcggaattca ggcctcagta ngaraawgaa ccngtrttra artc 44

<210> 56
<211> 10
<212> PRT
<213> Candida sonorensis

<400> 56

Trp Ala Gly Asn Ala Asn Glu Leu Asn Ala
1 5 10

<210> 57

<211> 10

<212> PRT

<213> Candida sonorensis

<400> 57

Asp Phe Asn Thr Gly Ser Phe Ser Tyr Ser
1 5 10

<210> 58

<211> 18

<212> DNA

<213> Candida sonorensis

<400> 58

tctgttmcct acrttaaga

18

<210> 59

<211> 20

<212> DNA

<213> Candida sonorensis

<400> 59

gtygggtgggc acgaagggtgc

20

<210> 60

<211> 36

<212> DNA

<213> Candida sonorensis

<400> 60

gcgatctcga gaaagaaacg acccatccaa gtgatg

36

<210> 61

<211> 68

<212> DNA

<213> Candida sonorensis

<400> 61

tggactagta catgcatgcg gtgagaaagt agaaagcaaa cattgtatat agtcttttct

60

attattag

68

<210> 62

<211> 34
<212> DNA
<213> Candida sonorensis

<400> 62
gcgatctcga gaaaatgtta ttataacact acac 34

<210> 63
<211> 75
<212> DNA
<213> Candida sonorensis

<400> 63
tggactagta catgcatgcg gtgagaaagt agaaagcaaa cttttgttt gatttgtttg 60
ttttgttttt gtttg 75

<210> 64
<211> 36
<212> DNA
<213> Candida sonorensis

<400> 64
gcgatctcga gaaagaaacg acccatccaa gtgatg 36

a'
<210> 65
<211> 35
<212> DNA
<213> Candida sonorensis

<400> 65
acttgccat ggtatatagt cttttctatt attag 35
